



#9

SEQUENCE LISTING

<110> Ryazanov, Alexey
<120> MAMMALIAN ALPHA-KINASE PROTEINS, NUCLEIC ACIDS AND DIAGNOSTIC AND
THERAPEUTIC USES THEREOF
<130> 601-1-098CIP
<140> 09/832,292
<141> 2001-04-10
<150> 09/632,131
<151> 2001-08-03
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<170> PatentIn version 3.1
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<212> PRT
<213> Homo sapiens
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Lys Arg Tyr Ile Glu Pro Val Asn Arg Asp Val Tyr Phe Glu Asp Val
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Arg Leu Gln Met Glu Ala Lys Leu Trp Gly Asp Asp Tyr Asn Arg His
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Lys Pro Pro Lys Gln Val Asp Ile Met Gln Met Cys Ile Ile Glu Leu
85 90 95

Lys Asp Arg Pro Gly Lys Pro Leu Phe His Leu Asp His Tyr Ile Asp
100 105 110

Gly Lys Tyr Ile Lys Tyr Asn Ser Asn Ser Gly Phe Val Arg Asp Asp
115 120 125

Asn Ile Arg Leu Thr Pro Gln Ala Phe Ser His Phe Thr Phe Glu Arg
130 135 140

Ser Gly His Gln Leu Ile Val Val Asp Ile Gln Gly Val Gly Asp Leu
145 150 155 160

Tyr Thr Asp Pro Gln Ile His Thr Glu Thr Gly Thr Asp Phe Gly Asn
165 170 175

Gly Asn Leu Gly Val Arg Gly Met Ala Leu Phe Phe Tyr Ser His Ala
180 185 190

Cys Asn Arg Ile Cys Glu Ser Met Gly Leu Ala Pro Phe Asp Leu Ser
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Pro Arg Glu Arg Asp Ala Val Asn Gln Asn Thr Lys Leu Leu Gln Ser
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Ala Lys Thr Ile Leu Arg Gly Thr Asp Asp Lys Cys Gly Ser
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<213> C. elegans
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Lys His Gly Thr Ser Gln Asp Trp Ser Ser Asn Tyr Val Ala Lys Arg
35 40 45

Tyr Ile Cys Gln Val Asp Arg Arg Val Leu Phe Asp Asp Val Arg Leu
50 55 60

Gln Met Asp Ala Lys Leu Trp Ala Glu Glu Tyr Asn Arg Tyr Asn Pro
65 70 75 80

Pro Lys Lys Ile Asp Ile Val Gln Met Cys Val Ile Glu Met Ile Asp
85 90 95

Val Lys Gly Ser Pro Leu Tyr His Leu Glu His Phe Ile Glu Gly Lys
100 105 110

Tyr Ile Lys Tyr Asn Ser Asn Ser Gly Phe Val Ser Asn Ala Ala Arg
115 120 125

Leu Thr Pro Gln Ala Phe Ser His Phe Thr Phe Glu Arg Ser Gly His
130 135 140

Gln Met Met Val Val Asp Ile Gln Gly Val Gly Asp Leu Tyr Thr Asp
145 150 155 160

Pro Gln Ile His Thr Val Val Gly Thr Asp Tyr Gly Asp Gly Asn Leu
165 170 175

Gly Ile Arg Gly Met Ala Leu Phe Phe His Ser His Arg Cys Asn Asp
180 185 190

Ile Cys Glu Thr Met Asp Leu Ser Asn Phe Glu Leu Ser Pro Pro Glu
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Ile Glu Ala Thr Glu Val Ala Met Glu Val Ala Ala Lys Gln Lys Lys
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Ser Cys Ile Val Pro Pro Thr Val Phe
225 230

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<213> Dictyostelium discoideum
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Phe Pro Pro Ile Glu Met Ile Ser Pro Ile Ser Lys Asn Asn Gly Ala
50 55 60

Met Thr Gln Leu Lys Asn Gly Thr Lys Phe Val Leu Lys Leu Tyr Lys
65 70 75 80

Lys Glu Ala Glu Gln Gln Ala Ser Arg Glu Leu Tyr Phe Glu Asp Val
85 90 95

Lys Met Gln Met Val Cys Arg Asp Trp Gly Asn Lys Phe Asn Gln Lys
100 105 110

Lys Pro Pro Lys Lys Ile Glu Phe Leu Met Ser Trp Val Val Glu Leu
115 120 125

Ile Asp Arg Ser Pro Ser Ser Asn Gly Gln Pro Ile Leu Cys Ser Ile
130 135 140

Glu Pro Leu Leu Val Gly Glu Phe Lys Lys Asn Asn Ser Asn Tyr Gly
145 150 155 160

Ala Val Leu Thr Asn Arg Ser Thr Pro Gln Ala Phe Ser His Phe Thr
165 170 175

Tyr Gly Leu Ser Asn Lys Gln Met Ile Val Val Asp Ile Gln Gly Val
180 185 190

Asp Asp Leu Tyr Thr Asp Pro Gln Ile His Thr Pro Asp Gly Lys Gly
195 200 205

Phe Gly Leu Gly Asn Leu Gly Lys Ala Gly Ile Asn Lys Phe Ile Thr
210 215 220

Thr His Lys Cys Asn Ala Val Cys Ala Leu Leu Asp Leu Asp Val Lys
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35 40 45

Thr Pro Arg Pro Ser Tyr Phe Glu Asp Val Lys Met Gln Met Ile Ala
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Lys Lys Trp Ala Asp Lys Tyr Asn Ser Phe Lys Pro Pro Lys Lys Ile
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Glu Phe Leu Gln Ser Cys Val Leu Glu Phe Val Asp Arg Thr Ser Ser
85 90 95

Asp Leu Ile Cys Gly Ala Glu Pro Tyr Val Glu Gly Gln Tyr Arg Lys
100 105 110

Tyr Asn Asn Asn Ser Gly Phe Val Ser Asn Asp Glu Arg Asn Thr Pro
115 120 125

Gln Ser Phe Ser His Phe Thr Tyr Glu His Ser Asn His Gln Leu Leu
130 135 140

Ile Ile Asp Ile Gln Gly Val Gly Asp His Tyr Thr Asp Pro Gln Ile
145 150 155 160

His Thr Tyr Asp Gly Val Gly Phe Gly Ile Gly Asn Leu Gly Gln Lys
165 170 175

Gly Phe Glu Lys Phe Leu Asp Thr His Lys Cys Asn Ala Ile Cys Gln
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Tyr Leu Asn Leu Gln Ser Ile Asn Pro Lys Ser Glu Lys Ser Asp Cys
195 200 205

Gly Thr Val Pro
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<211> 2178

<212> DNA

<213> Homo sapiens

<400> 5

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 20 25 30

Asp Glu Glu Gly Tyr Phe Ile Cys Pro Ile Thr Asp Asp Pro Ser Ser
 35 40 45

Asn Gln Asn Val Asn Ser Lys Val Asn Lys Tyr Tyr Ser Asn Leu Thr
 50 55 60

Lys Ser Glu Arg Tyr Ser Ser Ser Gly Ser Pro Ala Asn Ser Phe His
 65 70 75 80

Phe Lys Glu Ala Asn Lys His Ala Ile Gln Lys Ala Lys His Met Pro
 85 90 95

Asp Pro Trp Ala Glu Phe His Leu Glu Asp Ile Ala Thr Glu Arg Ala
 100 105 110

Thr Arg His Arg Tyr Asn Ala Val Thr Gly Glu Trp Leu Asp Asp Glu
 115 120 125

Val Leu Ile Lys Met Ala Ser Gln Pro Phe Gly Arg Gly Ala Met Arg
 130 135 140

Glu Cys Phe Arg Thr Lys Lys Leu Ser Asn Phe Leu His Ala Gln Gln
 145 150 155 160

Trp Lys Gly Ala Ser Asn Tyr Val Ala Lys Arg Tyr Ile Glu Pro Val
 165 170 175

Asp Arg Asp Val Tyr Phe Glu Asp Val Arg Leu Gln Met Glu Ala Lys
 180 185 190

Leu Trp Gly Glu Glu Tyr Asn Arg His Lys Pro Pro Lys Gln Val Asp
 195 200 205

Ile Met Gln Met Cys Ile Ile Glu Leu Lys Asp Arg Pro Gly Lys Pro
 210 215 220

Leu Phe His Leu Glu His Tyr Ile Glu Gly Lys Tyr Ile Lys Tyr Asn
 225 230 235 240

Ser Asn Ser Gly Phe Val Arg Asp Asp Asn Ile Arg Leu Thr Pro Gln
 245 250 255

Ala Phe Ser His Phe Thr Phe Glu Arg Ser Gly His Gln Leu Ile Val

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Val Asp Ile Gln Gly Val Gly Asp Leu Tyr Thr Asp Pro Gln Ile His 275 280 285		
Thr Glu Thr Gly Thr Asp Phe Gly Asp Gly Asn Leu Gly Val Arg Gly 290 295 300		
Met Ala Leu Phe Phe Tyr Ser His Ala Cys Asn Arg Ile Cys Glu Ser 305 310 315 320		
Met Gly Leu Ala Pro Phe Asp Leu Ser Pro Arg Glu Arg Asp Ala Val 325 330 335		
Asn Gln Asn Thr Lys Leu Leu Gln Ser Ala Lys Thr Ile Leu Arg Gly 340 345 350		
Thr Glu Glu Lys Cys Gly Ser Pro Arg Val Arg Thr Leu Ser Gly Ser 355 360 365		
Arg Pro Pro Leu Leu Arg Pro Leu Ser Glu Asn Ser Gly Asp Gly Asn 370 375 380		
Met Ser Asp Val Thr Pro Asp Ser Leu Pro Ser Ser Pro Ser Ser Ala 385 390 395 400		
Thr Pro His Ser Gln Lys Leu Asp His Leu His Trp Pro Val Phe Ser 405 410 415		
Asp Leu Asp Asn Met Ala Ser Arg Asp His Asp His Leu Asp Asn His 420 425 430		
Arg Glu Ser Glu Asn Ser Gly Asp Ser Gly Tyr Pro Ser Glu Lys Arg 435 440 445		
Gly Glu Leu Asp Asp Pro Glu Pro Arg Glu His Gly His Ser Tyr Ser 450 455 460		
Asn Arg Lys Tyr Gly Ser Asp Glu Asp Ser Leu Gly Ser Ser Gly Arg 465 470 475 480		
Val Cys Val Glu Lys Trp Asn Leu Leu Asn Ser Ser Arg Leu His Leu 485 490 495		
Pro Arg Ala Ser Ala Val Ala Leu Glu Val Gln Arg Leu Asn Ala Leu 500 505 510		

Asp Leu Glu Lys Lys Ile Gly Lys Ser Ile Leu Gly Asp Val His Leu
515 520 525

Ala Met Val Arg Tyr His Glu Gly Gly Arg Phe Cys Glu Lys Gly Glu
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Glu Trp Asp Gln Glu Ser Ala Val Phe His Leu Glu His Ala Ala Asn
545 550 555 560

Leu Gly Glu Leu Glu Ala Ile Val Gly Leu Gly Leu Met Tyr Ser Gln
565 570 575

Leu Pro His His Ile Leu Ala Asp Val Ser Leu Lys Glu Thr Glu Glu
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Asn Lys Thr Lys Gly Phe Asp Tyr Leu Leu Lys Ala Ala Glu Ala Gly
595 600 605

Asp Arg Gln Ser Met Ile Leu Val Ala Arg Ala Phe Asp Ser Gly Gln
610 615 620

Asn Leu Ser Pro Asp Arg Cys Gln Asp Trp Leu Glu Ala Leu His Trp
625 630 635 640

Tyr Asn Thr Ala Leu Glu Met Thr Asp Cys Asp Glu Gly Gly Glu Tyr
645 650 655

Asp Gly Met Gln Asp Glu Arg Tyr Met Met Leu Ala Arg Glu Ala Glu
660 665 670

Met Leu Phe Thr Gly Gly Tyr Gly Leu Glu Lys Asp Pro Gln Arg Ser
675 680 685

Gly Asp Leu Tyr Thr Gln Ala Ala Glu Ala Ala Met Glu Ala Met Lys
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Gly Arg Leu Ala Asn Gln Tyr Tyr Gln Lys Ala Glu Glu Ala Trp Ala
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<211> 2175
<212> DNA
<213> Mus musculus

<400> 7

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 <212> PRT
 <213> Mus musculus
 <400> 8

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Asp Asp Glu Gly Tyr Phe Ile Cys Pro Ile Thr Asp Asp His Met Ser
 35 40 45

Asn Gln Asn Val Ser Ser Lys Val Gln Ser Tyr Tyr Ser Asn Leu Thr
 50 55 60

Lys Thr Glu Leu Cys Gly Ser Thr Gly Ser Pro Ala Ser Ser Phe His
 65 70 75 80

Phe Lys Glu Ala Trp Lys His Ala Ile Glu Lys Ala Lys His Met Pro
 85 90 95

Asp Pro Trp Ala Glu Phe His Leu Glu Asp Ile Ala Thr Glu His Ala
 100 105 110

Thr Arg His Arg Tyr Asn Ala Val Thr Gly Glu Trp Leu Lys Asp Glu
 115 120 125

Val Leu Ile Lys Met Ala Ser Gln Pro Phe Gly Arg Gly Ala Met Arg
 130 135 140

Glu Cys Phe Arg Thr Lys Lys Leu Ser Asn Phe Leu His Ala Gln Gln
 145 150 155 160

Trp Lys Gly Ala Ser Asn Tyr Val Ala Lys Arg Tyr Ile Glu Pro Val
 165 170 175

Asp Arg Ser Val Tyr Phe Glu Asp Val Gln Leu Gln Met Glu Ala Lys
 180 185 190

Leu Trp Gly Glu Asp Tyr Asn Arg His Lys Pro Pro Lys Gln Val Asp
 195 200 205

Ile Met Gln Met Cys Ile Ile Glu Leu Lys Asp Arg Pro Gly Gln Pro
 210 215 220

Leu Phe His Leu Glu His Tyr Ile Glu Gly Lys Tyr Ile Lys Tyr Asn
 225 230 235 240

Ser Asn Ser Gly Phe Val Arg Asp Asp Asn Ile Arg Leu Thr Pro Gln
 245 250 255

Ala Phe Ser His Phe Thr Phe Glu Arg Ser Gly His Gln Leu Ile Val
 260 265 270

Val Asp Ile Gln Gly Val Gly Asp Leu Tyr Thr Asp Pro Gln Ile His
 275 280 285

Thr Glu Lys Gly Thr Asp Phe Gly Asp Gly Asn Leu Gly Val Arg Gly
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Met Ala Leu Phe Phe Tyr Ser His Ala Cys Asn Arg Ile Cys Gln Ser
 305 310 315 320

Met Gly Leu Thr Pro Phe Asp Leu Ser Pro Arg Glu Gln Asp Ala Val
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Asn Gln Ser Thr Arg Leu Leu Gln Ser Ala Lys Thr Ile Leu Arg Gly
 340 345 350

Thr Glu Glu Lys Cys Gly Ser Pro Arg Ile Arg Thr Leu Ser Ser Ser
 355 360 365

Arg Pro Pro Leu Leu Leu Arg Leu Ser Glu Asn Ser Gly Asp Glu Asn
 370 375 380

Met Ser Asp Val Thr Phe Asp Ser Leu Pro Ser Ser Pro Ser Ser Ala
 385 390 395 400

Thr Pro His Ser Gln Lys Leu Asp His Leu His Trp Pro Val Phe Gly

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Glu Met Leu Leu Thr Gly Gly Phe Gly Leu Asp Lys Asn Pro Gln Arg
675 680 685

Ser Gly Asp Leu Tyr Thr Gln Ala Ala Glu Ala Ala Met Glu Ala Met
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Lys Gly Arg Leu Ala Asn Gln Tyr Tyr Gly Lys Ala Glu Glu Ala Trp
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Ala Gln Met Glu Glu
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<210> 9

<211> 3465

<212> DNA

<213> Dictyostelium discoideum

<400> 9

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Pro Phe Lys Lys Phe Gly Cys Ser Ser Phe Leu Val Ser Lys Ala Glu
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Phe Asp Asn His Leu Lys Asp Asp Ala Gln Phe His Leu Gln Leu Ala
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Val Glu Lys Phe Asp His Gln Phe Asp Leu His Thr Gln Leu Met Ala
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His Phe Thr Glu Gln Met Glu Asp Gln Leu Glu Lys Thr Met Lys Val
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Val Arg Asn His Thr Asp Ser Leu Gly Gly Asn Val Gln Thr Lys Leu
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Gln Gln Gln Gln Leu Ala Lys Arg Leu Ile Thr Gln Gln Ile Gln Glu
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 Gly Gly Ser Gly Gly Asp Asp Ser Phe Asp Gly Ala Asn Ile Ser Ser
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 Glu Gly Glu Val Asn Glu Lys Ile Asp Lys Arg Gln Leu Val Ser Thr
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 Glu Gln Asn Gln Leu Leu Phe Asp Ser Lys Ile Glu Ser Leu Lys Asp
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 Arg Lys Leu Lys Leu Glu Ser Thr Ser Ser Glu Asn Leu Met Ala Gly
 325 330 335
 Leu Asn Gly Thr Ser Gly Arg Pro Ser Ser Ser Ser His Phe Ile Pro
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 Ser Ser Val Ser Ala Ala Ala Asn Asn Ile Asn Lys Asn Glu Ile Met
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 Glu Glu Val Lys Lys Val Glu Glu Lys Leu Gln Lys Lys Ile Arg Glu
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 Glu Ile Asp Asn Thr Lys Ala Glu Leu Ser Lys Val Glu Arg Ser Val

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Tyr Asn Glu Phe Val Asp Arg Glu Arg Asp Arg Glu Ser Glu Arg Leu						
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Lys Leu Gln Asp Ser Ile Lys Arg Leu Glu Gln Asn Gln Lys Lys Ile						
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Glu Glu Ala Ser Ile Ser Pro Ile Ser Ser Val Pro Lys Ser Pro Ile						
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Thr Thr Lys Arg Ser Ser Ile Ile Leu Asn Ser Pro Pro Met Thr Ser						
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Gln Gln Ser Ser Pro Lys Ile Gln Asp Leu Leu Ser Ser Ser Gly Ser						
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Ser Ser Val Ser Gly Ile Asn Ile Ser Ser Glu Thr Gly Glu Met Gly						
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Met Lys Leu Lys Val Glu Arg Lys Pro Phe Ala Glu Gly Ala Leu Arg						
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Glu Ala Tyr His Thr Val Ser Leu Gly Val Gly Thr Asp Glu Asn Tyr						
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Pro Leu Gly Thr Thr Thr Lys Leu Phe Pro Pro Ile Glu Met Ile Ser						
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Pro Ile Ser Lys Asn Asn Glu Ala Met Thr Gln Leu Lys Asn Gly Thr						
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 Arg Glu Leu Tyr Phe Glu Asp Val Lys Met Gln Met Val Cys Arg Asp
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 Trp Gly Asn Lys Phe Asn Gln Lys Lys Pro Pro Lys Lys Ile Glu Phe
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 Leu Met Ser Trp Val Val Glu Leu Ile Asp Arg Ser Pro Ser Ser Asn
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 Gly Gln Pro Ile Leu Cys Ser Ile Glu Pro Leu Leu Val Gly Glu Phe
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 Lys Lys Asn Asn Ser Asn Tyr Gly Ala Val Leu Thr Asn Arg Ser Thr
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 Pro Gln Ala Phe Ser His Phe Thr Tyr Glu Leu Ser Asn Lys Gln Met
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 755 760 765
 Ile His Thr Pro Asp Gly Lys Gly Phe Gly Leu Gly Asn Leu Gly Lys
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Gln Lys Leu Leu Cys Ala Gly Tyr Gly Asp Gly Thr Tyr Arg Val Phe
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Asp Val Asn Asp Asn Trp Lys Cys Leu Tyr Thr Val Asn Gly His Arg
900 905 910

Lys Ser Ile Glu Ser Ile Ala Cys Asn Ser Asn Tyr Ile Phe Thr Ser
915 920 925

Ser Pro Asp Asn Thr Ile Lys Val His Ile Ile Arg Ser Gly Asn Thr
930 935 940

Lys Cys Ile Glu Thr Leu Val Gly His Thr Gly Glu Val Asn Cys Val
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Val Ala Asn Glu Lys Tyr Leu Phe Ser Cys Ser Tyr Asp Lys Thr Ile
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Lys Val Trp Asp Leu Ser Thr Phe Lys Glu Ile Lys Ser Phe Glu Gly
980 985 990

Val His Thr Lys Tyr Ile Lys Thr Leu Ala Leu Ser Gly Arg Tyr Leu
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Phe Ser Gly Gly Asn Asp Gln Ile Ile Tyr Val Trp Asp Thr Glu
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Thr Leu Ser Met Leu Phe Asn Met Gln Gly His Glu Asp Trp Val
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Leu Ser Leu His Cys Thr Ala Ser Tyr Leu Phe Ser Thr Ser Lys
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Asp Asn Val Ile Lys Ile Trp Asp Leu Ser Asn Phe Ser Cys Ile
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Asp Thr Leu Lys Gly His Trp Asn Ser Val Ser Ser Cys Val Val
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Lys Asp Arg Tyr Leu Tyr Ser Gly Ser Glu Asp Asn Ser Ile Lys
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Val Trp Asp Leu Asp Thr Leu Glu Cys Val Tyr Thr Ile Pro Lys
1100 1105 1110

Ser His Ser Leu Gly Val Lys Cys Leu Met Val Phe Asn Asn Gln

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<212> DNA

<213> Dictyostelium discoideum

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35 40 45

Leu Gln Ile Gly Lys Met Leu Pro Ser Gly Ser Gly Gly Gly Ala Thr
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Ala Asp Ser Lys Phe Glu Lys Phe Lys Ala Arg Asn Thr Leu Ala Asp
65 70 75 80

Ile Gln Tyr Lys Val Gly Asp Thr Leu Tyr Val Arg Val Lys Lys Ser
85 90 95

Lys Pro Thr Asn Asp Ser Leu Leu Pro Thr Leu Asn Ile Ala Phe Leu
 100 105 110

Asp Gly Ser Glu Arg Ala Ile Lys Trp Glu Tyr Asp Pro Tyr Thr Thr
 115 120 125

Thr Ala Gln Trp Thr Cys Thr Ala Thr Leu Val Lys Val Glu Pro Val
 130 135 140

Pro Phe Ala Glu Gln Ala Phe Arg Lys Ala Tyr His Thr Leu Asp Leu
 145 150 155 160

Ser Lys Ser Gly Ala Ser Gly Arg Tyr Val Ser Lys Ile Gly Lys Lys
 165 170 175

Pro Thr Pro Arg Pro Ser Tyr Phe Glu Asp Val Lys Met Gln Met Ile
 180 185 190

Ala Lys Lys Trp Ala Asp Lys Tyr Asn Ser Phe Lys Pro Pro Lys Lys
 195 200 205

Ile Glu Phe Leu Gln Ser Cys Val Leu Glu Phe Val Asp Arg Thr Ser
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Ser Asp Leu Ile Cys Gly Ala Glu Pro Tyr Val Glu Gly Gln Tyr Arg
 225 230 235 240

Lys Tyr Asn Asn Asn Ser Gly Phe Val Ser Asn Asp Glu Arg Asn Thr
 245 250 255

Pro Gln Ser Phe Ser His Phe Thr Tyr Glu His Ser Asn His Gln Leu
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 290 295 300

Lys Gly Phe Glu Lys Phe Leu Asp Thr His Lys Cys Asn Ala Ile Cys
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Gln Tyr Leu Asn Leu Gln Ser Ile Asn Pro Lys Ser Glu Lys Ser Asp
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Cys Gly Thr Val Pro Arg Pro Asp Leu Ile Phe Pro Asp Thr Ser Glu

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Asp Lys Thr Ile Arg Val Trp Asn Leu Lys Ser Leu Glu Cys Ser Ala
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Thr Leu Arg Gly His Asp Arg Trp Val Glu His Met Val Ile Cys Asp
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Lys Leu Leu Phe Thr Ala Ser Asp Asp Asn Thr Ile Lys Ile Trp Asp
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<211> 2307

<212> DNA

<213> C. elegans

<400> 13

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Asp Ile Ala Arg Lys Cys Gly Ile Leu Glu Ala Val Leu Thr Ser Ala
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Ala Asp Lys Gly Gln Lys Pro Cys Asp Leu Glu Glu Phe Gly Ser Asp
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 675 680 685

Gln Glu Glu Glu Leu Asp Ser Asp Cys Gly Lys Thr Thr Phe Ser Ser
 690 695 700

Phe Ala Pro Leu Thr Arg His Glu Ile Leu Ala Lys Met Ala Glu Met
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Tyr Lys Glu Gly Gly Tyr Gly Leu Asn Gln Asp Phe Glu Arg Ala Tyr
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Lys Leu Ala Asn Lys Tyr Tyr Glu Lys Ala Glu Met Cys Gly Glu
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Lys Gln His Ala Cys Phe Thr Ala Ser Leu Ala Met Lys Tyr Ser Asp
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Glu Lys His Thr Glu Gln Ser Pro Thr Asp Ala Tyr Gly Val Ile Asn
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Thr Phe Asn Phe Gly Gln Asn Glu Ala Leu His Leu Phe Gln Thr Leu
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Met Glu Cys Met Lys Arg Lys Glu Leu Ile Thr Val Phe His Ile Gly
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Lys Gly Thr Asn Ala Ser Ala Phe Asp Gln Leu Ile Leu Thr Leu Ala
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Trp Asp Arg Val Asp Ile Ala Lys Asn His Val Phe Val Tyr Gly Gln
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Met His Lys Phe Leu Thr Ile Pro Arg Leu Glu Glu Leu Tyr Asn Thr
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Lys Gln Gly Asn Leu Pro Pro Gly Tyr Lys Ile Thr Leu Ile Asp Ile
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Arg Arg Ser Gly Arg Asn Thr Ser Ser Ser Thr Pro Gln Leu Arg Lys
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Ser His Glu Ser Phe Gly Asn Arg Ala Asp Lys Lys Glu Lys Met Arg
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His Asn His Phe Ile Lys Thr Ala Gln Pro Tyr Arg Pro Lys Ile Asp
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Asp Ile Asp Asp Pro Glu Thr Lys Arg Phe Pro Tyr Pro Leu Asn Glu
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Asp Asp Thr Ser Glu Glu Leu Lys Gln Tyr Ser Asn Asp Phe Gly Gln
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Ala Met Lys Leu Leu Thr Tyr Glu Leu Lys Asn Trp Ser Asn Ser Thr
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Cys Leu Lys Leu Ala Val Ala Ala Lys His Arg Asp Phe Ile Ala His
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Met Arg Lys Asn Pro Gly Leu Lys Val Ile Leu Ser Ile Leu Val Pro
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Pro Ala Ile Leu Leu Leu Glu Tyr Lys Thr Lys Ala Glu Met Ser His
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Glu Gly Thr Leu Asn Gly Leu Thr Ser Pro Phe Lys Pro Ala Met	1535	1540		1545	
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<213> Mus musculus

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Val Tyr Ile Ile Pro Ser Ser Lys Asp Pro His Arg Cys Leu Pro Gly
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Lys Gln His Ala Cys Phe Thr Ala Ser Leu Ala Met Lys Tyr Ser Asp
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Val Arg Leu Gly Glu His Phe Asn Gln Ala Ile Glu Glu Trp Ser Val
 65 70 75 80

Glu Lys His Thr Glu Gln Ser Pro Thr Asp Ala Tyr Gly Val Ile Asn
 85 90 95

Phe Gln Gly Gly Ser His Ser Tyr Arg Ala Lys Tyr Val Arg Leu Ser
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Tyr Asp Thr Lys Pro Glu Ile Ile Leu Gln Leu Leu Leu Lys Glu Trp
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Gln Met Glu Leu Pro Lys Leu Val Ile Ser Val His Gly Gly Met Gln
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Lys Phe Glu Leu His Pro Arg Ile Lys Gln Leu Leu Gly Lys Gly Leu
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Ile Lys Ala Ala Val Thr Thr Gly Ala Trp Ile Leu Thr Gly Gly Val
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Asn Thr Gly Val Ala Lys His Val Gly Asp Ala Leu Lys Glu His Ala
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Ser Arg Ser Ser Arg Lys Ile Cys Thr Ile Gly Ile Ala Pro Trp Gly
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Val Ile Glu Asn Arg Asn Asp Leu Val Gly Arg Asp Val Val Ala Pro
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Cys	Leu	Lys	Leu	Ala	Val	Ser	Ser	Arg	Leu	Arg	Pro	Phe	Val	Ala	His
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Thr	Cys	Thr	Gln	Met	Leu	Leu	Ser	Asp	Met	Trp	Met	Gly	Arg	Leu	Asn
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Pro	Ala	Ile	Leu	Met	Leu	Glu	Tyr	Lys	Thr	Lys	Ala	Glu	Met	Ser	His
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Asn	Asn	Phe	His	Asn	Ile	Thr	Glu	Glu	Ile	Pro	Met	Glu	Val	Phe	Lys
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Glu	Val	Lys	Ile	Leu	Asp	Ser	Ser	Asp	Gly	Lys	Asn	Glu	Met	Glu	Ile
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Gly Arg Leu Ile Tyr Cys Leu Asn Ile Ile Phe Trp Tyr Val Arg Leu
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Ile Gly Lys Met Val Ala Asn Met Phe Tyr Ile Val Val Ile Met Ala
995 1000 1005

Leu Val Leu Leu Ser Phe Gly Val Pro Arg Lys Ala Ile Leu Tyr
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Pro His Glu Glu Pro Ser Trp Ser Leu Ala Lys Asp Ile Val Phe
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His Pro Tyr Trp Met Ile Phe Gly Glu Val Tyr Ala Tyr Glu Ile
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Val Tyr Leu Gln Val Lys Ala Ile Ser Asn Ile Val Trp Lys Tyr
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Gln Arg Tyr His Phe Ile Met Ala Tyr His Glu Lys Pro Val Leu
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Pro Pro Pro Leu Ile Ile Leu Ser His Ile Val Ser Leu Phe Cys
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His	Leu	Gln	Asp	Leu	Ser	Ala	Leu	Thr	Val	Asp	Thr	Leu	Lys	Thr
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Arg Glu Leu Leu Ser Asn Asp Thr Pro Glu Asn Thr Leu Lys His	1460	1465		1470
Val Gly Ala Ala Gly Tyr Ser Glu Cys Cys Lys Thr Ser Thr Ser	1475	1480		1485
Leu His Ser Val Gln Ala Glu Ser Cys Ser Arg Arg Ala Ser Thr	1490	1495		1500
Glu Asp Ser Pro Glu Val Asp Ser Lys Ala Ala Leu Leu Pro Asp	1505	1510		1515
Trp Leu Arg Asp Arg Pro Ser Asn Arg Glu Met Pro Ser Glu Gly	1520	1525		1530
Gly Thr Leu Asn Gly Leu Ala Ser Pro Phe Lys Pro Val Leu Asp	1535	1540		1545
Thr Asn Tyr Tyr Tyr Ser Ala Val Glu Arg Asn Asn Leu Met Arg	1550	1555		1560
Leu Ser Gln Ser Ile Pro Phe Val Pro Val Pro Pro Arg Gly Glu	1565	1570		1575
Pro Val Thr Val Tyr Arg Leu Glu Glu Ser Ser Pro Ser Ile Leu	1580	1585		1590
Asn Asn Ser Met Ser Ser Trp Ser Gln Leu Gly Leu Cys Ala Lys	1595	1600		1605
Ile Glu Phe Leu Ser Lys Glu Glu Met Gly Gly Gly Leu Arg Arg	1610	1615		1620
Ala Val Lys Val Leu Cys Thr Trp Ser Glu His Asp Ile Leu Lys	1625	1630		1635
Ser Gly His Leu Tyr Ile Ile Lys Ser Phe Leu Pro Glu Val Ile	1640	1645		1650

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Phe	Ala	Phe	Asn	Gln	Met	Lys	Pro	Lys	Ser	Ile	Pro	Tyr	Ser	Pro
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Gln	Arg	Ile	His	Ala	Arg	Ile	Gly	Gln	Gly	Val	Pro	Val	Val	Ala	Leu	275	280	285	
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Gln	Glu	Ser	Pro	Pro	Val	Pro	Val	Val	Val	Cys	Glu	Gly	Thr	Gly	Arg	305	310	315	320
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Ser	Glu	Asp	His	Gln	Asp	Ile	Asp	Val	Ala	Ile	Leu	Thr	Ala	Leu	Leu	385	390	395	400
Lys	Gly	Thr	Asn	Ala	Ser	Ala	Phe	Asp	Gln	Leu	Ile	Leu	Thr	Leu	Ala	405	410	415	
Trp	Asp	Arg	Val	Asp	Ile	Ala	Lys	Asn	His	Val	Phe	Val	Tyr	Gly	Gln	420	425	430	
Gln	Trp	Leu	Val	Gly	Ser	Leu	Glu	Gln	Ala	Met	Leu	Asp	Ala	Leu	Val	435	440	445	
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Lys Gln Gly Pro Thr Asn Pro Met Leu Phe His Leu Ile Arg Asp Val
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Lys Gln Gly Asn Leu Pro Pro Gly Tyr Lys Ile Thr Leu Ile Asp Ile
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Gly Leu Val Ile Glu Tyr Leu Met Gly Gly Thr Tyr Arg Cys Thr Tyr
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Thr Arg Lys Arg Phe Arg Leu Ile Tyr Asn Ser Leu Gly Gly Asn Asn
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Arg Arg Ser Gly Arg Asn Thr Ser Ser Ser Thr Pro Gln Leu Arg Lys
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Ser His Glu Thr Phe Gly Asn Arg Ala Asp Lys Lys Glu Lys Met Arg
 565 570 575

His Asn His Phe Ile Lys Thr Ala Gln Pro Tyr Arg Pro Lys Met Asp
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Ala Ser Met Glu Glu Gly Lys Lys Lys Arg Thr Lys Asp Glu Ile Val
 595 600 605

Asp Ile Asp Asp Pro Glu Thr Lys Arg Phe Pro Tyr Pro Leu Asn Glu
 610 615 620

Leu Leu Ile Trp Ala Cys Leu Met Lys Arg Gln Val Met Ala Arg Phe
 625 630 635 640

Leu Trp Gln His Gly Glu Glu Ser Met Ala Lys Ala Leu Val Ala Cys
 645 650 655

Lys Ile Tyr Arg Ser Met Ala Tyr Glu Ala Lys Gln Ser Asp Leu Val
 660 665 670

Asp Asp Thr Ser Glu Glu Leu Lys Gln Tyr Ser Asn Asp Phe Gly Gln
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Ala Met Lys Leu Leu Thr Tyr Glu Leu Lys Asn Trp Ser Asn Ser Thr

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Gly Asp His Ala Gly Ile Asp Tyr Ser Trp Thr Ile Ser Ala Ala Lys
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Gly Lys Glu Ser Glu Gln Trp Ser Val Glu Lys His Thr Thr Lys Ser
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Pro Thr Asp Thr Phe Gly Thr Ile Asn Phe Gln Asp Gly Glu His Thr
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His His Ala Lys Tyr Ile Arg Thr Ser Tyr Asp Thr Lys Leu Asp His
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Leu Leu His Leu Met Leu Lys Glu Trp Lys Met Glu Leu Pro Lys Leu
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Val Ile Ser Val His Gly Gly Ile Gln Asn Phe Thr Met Pro Ser Lys
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Gly Asp Ala Leu Lys Ser His Ser Ser His Ser Leu Arg Lys Ile Trp
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Ile Gly Lys Asp Val Val Cys Leu Tyr Gln Thr Leu Asp Asn Pro Leu
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Ser Lys Leu Thr Thr Leu Asn Ser Met His Ser His Phe Ile Leu Ser
 225 230 235 240

Asp Asp Gly Thr Val Gly Lys Tyr Gly Asn Glu Met Lys Leu Arg Arg
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Asn Leu Glu Lys Tyr Leu Ser Leu Gln Lys Ile His Cys Arg Ser Arg
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Gln Gly Val Pro Val Val Gly Leu Val Val Glu Gly Gly Pro Asn Val
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Ile Leu Ser Val Trp Glu Thr Val Lys Asp Lys Asp Pro Val Val Val
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Cys Glu Gly Thr Gly Arg Ala Ala Asp Leu Leu Ala Phe Thr His Lys
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His Leu Ala Asp Glu Gly Met Leu Arg Pro Gln Val Lys Glu Glu Ile
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Ile Cys Met Ile Gln Asn Thr Phe Asn Phe Ser Leu Lys Gln Ser Lys
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Ile Ser Glu Pro Gly Lys Phe Thr Gln Lys Val Lys Val Trp Ile Ser
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Phe Phe Ala Val Asn Gln His Ala Gly Pro Tyr Val Thr Met Ile Ala
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Lys Met Thr Ala Asn Met Phe Tyr Ile Val Ile Ile Met Ala Ile Val
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Leu Leu Ser Phe Gly Val Ala Arg Lys Ala Ile Leu Ser Pro Lys Glu
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Pro Pro Ser Trp Ser Leu Ala Arg Asp Ile Val Phe Glu Pro Tyr Trp
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Leu Ala Phe Ser His Trp Thr Tyr Glu Tyr Thr Arg Gly Glu Leu 1895 1900 1905				
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Leu Lys Arg Asn Asp Tyr Ser Pro Glu Arg Ile Asn Ser Thr Phe 1970 1975 1980				
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Lys Thr Pro Ile Trp Asn Ser Gly Ser Thr Ser Leu Ser Arg Ser Phe
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Ser Pro Gln Glu Pro His His His Tyr Ser Ala Ile Glu Arg Asn Asn
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Leu Met Arg Leu Ser Gln Thr Ile Pro Phe Thr Pro Ile Gln Leu Phe
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Thr Leu Asp Lys Ser Met Ser Ser Trp Ser Gln His Gly Arg Ala Ala
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Met Ile Gln Val Leu Ser Gln Glu Glu Met Asp Gly Gly Leu Arg Lys
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Ala Met Arg Val Ile Ser Thr Trp Ser Glu Asp Asp Val Leu Lys Pro
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Gly Gln Val Phe Ile Val Lys Ser Phe Leu Pro Glu Val Val Gln Thr
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Ser Leu Val Tyr Cys His Ser Ala Asn Gln Trp Leu Thr Ile Glu Lys
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Tyr Met Thr Gly Glu Phe Arg Lys Tyr Asn Asn Asn Asn Gly Asp Glu
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 Glu Gly Met Gln Val Asn Thr Leu Phe Glu Thr Ser Gln Val Pro Asp
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 Trp Ser Asp Pro Pro Gln Val Gln Val Gln Glu Thr Val Arg Glu Thr
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 Cys Thr Cys Gly Pro Gln Gln Glu Glu Lys Gln Asp Arg Asp Gly Asn
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 Pro Lys Asp Ala Arg Ala Asp Phe Arg Glu Pro Val Ala Val Ser Val
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 Ala Ser Pro Glu Pro Thr Asp Thr Ala Leu Thr Leu Glu Asn Val Cys
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 Asp Glu Pro Arg Asp Arg Glu Ala Val Cys Ala Met Glu Cys Phe Glu
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Thr Pro Val Asp Asn Tyr Ser Pro Gln Glu Ile Cys Ser Val Asp Thr
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Asp Lys Thr Leu Glu Val Phe Phe Gln Thr Gln Val Ser Glu Thr Ser
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Val Ser Thr Cys Lys Ser Ser Lys Asp Gly Asn Ser Val Met Ser Pro
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Gly Ala Thr Gly Glu Asn Leu Ala Lys Val Glu Lys Ser Thr Tyr Pro
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Leu Ala Ser Thr Val His Ala Gly Gln Glu Gln Pro Ser Pro Ser Asn
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Leu Val Gln Phe Lys Glu Gly Gly Asp Lys Ser Pro Ser Pro Ser Ala
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Ala Asp Thr Thr Ala Thr Pro Ala Ser Tyr Ser Ser Ile Val Ser Phe
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Pro Trp Glu Lys Pro Thr Thr Leu Thr Ala Asn Asn Glu Cys Phe Gln
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Ala Thr Arg Glu Thr Val Thr Ile Ala Thr Glu Val His Pro Ala Lys
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Tyr Leu Ala Val Ser Ile Pro Glu Asp Lys His Ala Gly Gly Thr Glu
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Glu Arg Phe Pro Arg Ala Ser His Glu Lys Val Ser Gln Phe Pro Ser
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Gln Val Gln Val Asp His Ile Leu Ser Gly Ala Thr Ile Lys Ser Thr
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Lys Glu Leu Leu Cys Arg Ala Pro Ser Val Pro Gly Val Pro His His

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770 775 780

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785 790 795 800

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Lys Lys Phe Leu Thr Cys Pro Lys Ile Leu Glu Ser Ser Val Asp Pro
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Glu Arg Ile Pro Ser Gly Cys Ser Ile Gly Gln Ile Gln Glu Ser Ser
930 935 940

Asp Gly Ser Leu Gly Glu Ala Glu Gln Ser Lys Lys Asp Lys Ala Glu
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Leu Ile Ser Pro Thr Ser Pro Leu Ser Ser Cys Leu Pro Ile Met Thr
965 970 975

His Ser Ser Leu Gly Val Asp Thr His Asn Ser Thr Gly Gln Ile His
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Asp Gln Gly Leu Tyr Tyr Cys Cys Ile Lys Asn Ser Tyr Gly Lys	1280	1285		1290
Val Thr Ala Glu Phe Asn Leu Thr Ala Glu Val Leu Lys Gln Leu	1295	1300		1305
Ser Ser Arg Gln Asp Thr Lys Gly Cys Glu Glu Ile Glu Phe Ser	1310	1315		1320
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Glu Gly Val His Arg Lys Ala Phe Arg Ser Thr Val Met His Gly	1355	1360		1365
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His Asn Ala Ile Ala Tyr Gly Thr Arg Asn Asn Asp Glu Leu Ile	1385	1390		1395
Gln Arg Asn Tyr Lys Leu Ala Ala Gln Glu Cys Tyr Val Gln Asn	1400	1405		1410
Thr Ala Arg Tyr Tyr Ala Lys Ile Tyr Ala Ala Glu Ala Gln Pro	1415	1420		1425
Leu Glu Gly Phe Gly Glu Val Pro Glu Ile Ile Pro Ile Phe Leu	1430	1435		1440
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Glu Ser Ala Cys Glu Leu Ser Leu Leu Glu Asp Asn Glu Glu Glu Glu
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Ser Gln Pro Pro Ala Ser Val Ala Leu Pro Gln Gly Asp Gly Val Pro
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Pro Ser Leu Pro Leu Glu Asn Val Gly Ser Gly Ser Arg Val Arg Glu
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Ala Ala Gly Gly Val Gly Cys Phe Glu Ala Gly Asp Gln Glu Thr Cys
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Tyr Ala Thr Met Asp Leu Leu Val Gly Ala Pro Val Asp Lys Tyr Leu
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Glu Val Cys Asp Leu Cys Ser Pro Asp Lys Ile Leu Ala Val Leu Gln
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Thr Gln Gly Tyr Glu Pro Pro Arg Ser Thr Asp Lys Arg Ser Gln Asp
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Gly Lys Ser Ala Glu Gly Leu Leu Phe Asn Ser Thr Phe Thr Trp Asp
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Thr Ala Lys Glu Ala Ser Glu Asp Ala Val Gly Glu Thr Ala Ala Asp
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Val Glu Asn Pro Pro Ser Thr Phe Ser Ser Thr Leu Pro Tyr Ser Glu
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Arg Gly Phe Gly Glu Thr Gln Pro Leu Cys Ser Glu Thr Ile Ser Phe
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Val Lys Asp Ser Glu Gly Ser Tyr Arg Ser Ser Ser Leu Ser Ile Pro
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Ala Ala Ile Asp Thr Leu Ala Ser Tyr Ser Ser Asp Arg Glu Cys Ser
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Lys Glu Gln Ser Ala Glu Ser Thr Ala Asn Val Asp Cys His Gln Val
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Thr Arg Glu Met Glu Gly Ile Ser Thr Asn Ala Ala Glu Val His Glu
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Ile Lys Cys His Ser Val Ser Val Pro Gln Asp Asn Asp Phe Asp Val
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Gly Ala Asp Gln Val Ser Cys Glu Ala Arg Asp Glu Asp Asn Ser Gln
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Ser Gly Met Lys His Gly Ile Arg Pro Gln Ser Thr Ser His Gln Val
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Ser Leu Ser Ala Asn Asp Phe Gln Glu Ile Leu Pro Ser Ile Pro Thr
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Met Gln Gln Glu Thr Asn Val Glu Pro Leu Glu His Ser Leu Ala Asp
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Ser Arg Glu Glu Ile Glu Cys Ser Ser Asp Pro Arg Thr Ser Asp Leu
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Val Val Ala Glu Lys Thr Val Gly Glu Asp Ser His Leu Val Val Ser
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Val Pro Ala Leu Pro Asp Ile Leu Leu Gly Glu Lys Asp Asp Val Gly
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Ala Pro Val Phe Glu Ile Trp Pro Pro Glu Leu Val Arg His Pro Gly
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Tyr Lys Glu Ala Glu Ala Gly Leu Thr Met Pro Gly Arg Ser Trp Ala
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Leu Gly Gly Ala Ala Trp Val Pro Ser Pro Gln Ala Asp Ala Leu Met
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Ala Leu Gly Ala Asn Arg Asp Thr Trp Leu Gly Ala Ala Pro Asp Arg

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Ser Ser Pro Lys Gly Asn Val Thr Arg Leu Ser Ile Ser His Gly Leu
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Thr Lys Gly Pro Val Leu His Asp Gln Asp Thr Arg Cys Ala Phe Leu
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Gly Arg Gln Gly Ser Gly Leu Gly Ala Gly Pro Gly Ala Gly Thr Trp
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Lys Ala 1475	Pro Gln Val Ile	Arg 1480	Lys Ile Arg Val	Glu Gln Phe Pro 1485
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Thr Leu Ile Gln Glu Ala Lys Glu Met Lys Trp Pro Phe Val Pro Glu
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Ala Ser Ile Leu Ala Arg Asp Cys Ala Ala Ala Ala Ala Ile Val Phe
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Leu Val Asp Arg Phe Leu Tyr Gly Leu Asp Val Ser Gly Lys Leu Leu
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Gln Val Ala Lys Gly Leu His Lys Leu Gln Pro Ala Thr Pro Ile Ala
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Pro Gln Val Val Ile Arg Gln Ala Arg Ile Ser Val Asn Ser Gly Lys
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Ala Thr Gly Thr Trp Leu Tyr Arg Asn Glu Ser Asp Lys Val Leu Val
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Gln Ser Val Cys Ile Gln Ile Arg Gly Gln Ile Leu Gln Lys Leu Gly
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Ile Leu Ala Asp Ile Phe Val Ser Met Ser Lys Asn Asp Tyr Glu Lys
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Phe Lys Asn Asn Pro Gln Ile Asn Leu Ser Leu Leu Lys Glu Phe Asp
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His His Leu Leu Ser Ala Ala Glu Ala Cys Lys Leu Ala Ala Ala Phe
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Thr Cys Leu Leu Ser Tyr Ser Ser Ser Asn Asp Cys Pro Pro Glu Leu
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Lys Asn Leu His Leu Cys Glu Ala Lys Glu Ala Phe Glu Ile Gly Leu
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Ala Met Gly Lys Leu Tyr Asn Phe Ser Thr Ser Ser Arg Ser Gln Asp
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Arg Glu Ala Leu Ser Gln Glu Val Met Ser Val Ile Ala Gln Val Lys
 405 410 415

Glu His Leu Gln Val Gln Ser Phe Ser Asn Val Asp Asp Arg Ser Tyr
 420 425 430

Val Pro Glu Ser Phe Glu Cys Arg Leu Asp Lys Leu Ile Leu His Gly
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Gln Gly Asp Phe Gln Lys Ile Leu Asp Thr Tyr Ser Gln His His Thr
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Ser Val Cys Glu Val Phe Glu Ser Asp Cys Gly Asn Asn Lys Asn Glu
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Gln Lys Asp Ala Lys Thr Gly Val Cys Ile Thr Ala Leu Lys Thr Glu
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Ile Lys Asn Ile Asp Thr Val Ser Thr Thr Gln Glu Lys Pro His Cys
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Gln Arg Asp Thr Gly Ile Ser Ser Ser Leu Met Gly Lys Asn Val Gln
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Asp Tyr Ser Asn Gly Glu Gly Ala Val Phe Asn Lys Ser Leu Ser Gly
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Lys Glu Pro Gly Lys Glu His Leu Val Asp Thr Gln Cys Ser Thr Ala
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Leu His Ser Gln Leu His Asp Leu Ser Leu Gln Glu Pro Asn Asn Asp

645

650

655

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Gly Leu Leu Glu Gly Ala Pro Glu Gly Ile Gln Glu Val Arg Asn Met
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Gly Pro Arg Asn Thr Ser Ala His Ser Arg Pro Ser Tyr Arg Ser Ala
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930 935 940

Asp Ser Pro Trp Ser Tyr Leu Asn Ser Ser Gly Ser Ser Trp Val Ser
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Arg Gln Met Thr Ala Gln His Tyr Val Thr Glu Phe Asn Lys Arg
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Ser Val Glu Pro Tyr Ile Leu Gly Glu Phe Val Lys Leu Ser Asn
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